Approaches to Learning Management System Integration

Developer Technical Note
Introduction

A Learning Management System (LMS) is an application that allows instructors, training coordinators and managers to monitor student participation in Web-based and classroom training. Functionality may include content assembly, deployment, and tracking as well as enrolment and catalog development.

This document describes technical approaches and considerations for integrating WebEx services with a commercially available or internally developed LMS.

Several leading LMS vendors such as SumTotal, KnowledgePlanet, Plateau, Intelledon and Learn.com offer pre-packaged integrations with WebEx Meeting Center or Training Center. Contact those vendors for further information about the WebEx integrations they have developed.

This technical note focuses on integrating an LMS with the WebEx Training Center service. Although WebEx Meeting Center, Event Center or Sales Center can be integrated with an LMS, Training Center offers specialized training functionality that can be programmatically accessed via an LMS.
Scenario

A typical scenario for an integrated workflow between an LMS application and WebEx Training Center is described below.

**Actors**
- Training Coordinator – manages the course schedule and content.
- Instructor – delivers the course material.
- Student – attends the courses.

**Workflow**

- A Training Coordinator uses the LMS to schedule a WebEx Training Center session as part of a course offering along with other activities such as a traditional in-person classroom training, and pre- and post-reading assignments, etc.

- A Training Coordinator develops an online test using the WebEx Training Center website and adds it to the scheduled session.

- The Training Coordinator uses the LMS to assign an Instructor to the scheduled WebEx session.

- Students browse the LMS course catalog and enroll in the scheduled WebEx Training Center session.

- The Instructor logs into the LMS and sees they are assigned to the WebEx session. They use the LMS to start the WebEx session at the scheduled time.

- A Training Coordinator attending the WebEx session records the session to a local file.

- Students use the LMS to join the live WebEx session.

- After the WebEx session ends, the LMS queries the WebEx server for attendance information to verify how long each student attended the session.

- The Training Coordinator uploads the WebEx session recording file to the LMS web server or content management system as part of the course offering.

- Students who missed the live WebEx session can view the recorded session from the LMS.

- Students use the WebEx Training Center website to take the online test.

- The Instructor or Training Coordinator can use the LMS to retrieve the student test results from the WebEx server.
Technical Approach

WebEx offers two sets of Application Programming Interfaces (APIs) for partner integrations, the URL API and the XML API. The URL API is well suited for simple integrations such as single-sign on and basic session creation and launching. Due to the complex nature of most LMS integrations, we recommend using the XML API to achieve the most functionality in the integration.

This section describes techniques and API functions an LMS would call to handle User Management, Session Management, Student Registration, Test Result Retrieval, and Recorded Sessions.

User Management
Each Instructor and Training Coordinator should have a valid WebEx host account. The LMS will make the following calls to create and manage these accounts.

Creating a new user
The LMS system should call createUser to add a new WebEx host account for an Instructor or Training Coordinator. If a Training Coordinator will be scheduling WebEx sessions for an Instructor, then the training coordinator’s WebExID needs be specified in the instructor’s <schedulingPermissions> element.

Editing a user
The LMS system should call setUser to edit an Instructor or Training Coordinator's WebEx host account.

Single Sign On
The LMS system should store the WebExID and Password for each Instructor and Training Coordinator to avoid them having to remember and re-enter this information every time they use the WebEx integration. The LMS can set the WebExID to be the same as the unique LMS username. The WebEx password can be set to a value algorithmically generated from the LMS username. For additional Single Sign On considerations, refer to the technical note Approaches to Single Sign-On.

Session Management
The core functionality for an LMS-WebEx integration is in creating and managing live WebEx Training Center sessions. This section describes the XML API functions that an LMS calls to accomplish this.

Scheduling a session
The Training Coordinator interface offers the ability to schedule an interactive training session with Training Center. To schedule the session, the LMS calls create TrainingSession to schedule the session. For listing and browsing, the LMS should call getTrainingSession to return the detailed information for a session, including any web-based tests associated with the session. delTrainingSession will cancel the session and remove it from the calendar.
Assigning an Instructor to a session
The Training Coordinator interface calls setTrainingSession with set to the Instructor's WebExID. The Instructor should have been created with the Training Coordinator's WebExID specified in the <schedulingPermissions> element. Alternatively, the Instructor could allow the Training Coordinator to schedule sessions on her behalf in the WebEx Training Center “My Profile” web page.

Starting a session
The LMS should call getHosturlMeeting to retrieve the URL to start the WebEx session for the Instructor or The Training Coordinator. This URL must be called from a browser window to launch the Training Center session.

Joining a session
The LMS should call getJoinurlMeeting to retrieve the URL to allow students to join the WebEx session. This URL can be e-mailed to students, or can be a link within the LMS interface. It must be called from a browser window to join the Training Center session.

Student Registration
WebEx features a student registration system that can optionally be used to limit and track which students attended a Training Center session. Often LMS systems have their own student registration systems that may conflict with the WebEx Training Center registration functionality. This section details how an LMS would integrate with the WebEx attendee registration functionality.

Setup
To enable WebEx registration functionality, the Training Center session should be scheduled with the following options:

createTrainingSession

...  

<attendeeOptions>

   <registration>true</registration>

   <auto>true</auto>

</attendeeOptions>

...

Registration
The LMS should call createMeetingAttendee to register each student for the Training Center session. This returns the unique RegID for the student. The emailInvitations option controls whether to send a WebEx generated student invitation email. Most LMSs send their own emails. delMeetingAttendee will un-register a student from a session.

Joining the session
The LMS should call getJoinurlMeeting including attendeeName, attendeeEmail, and RegID for each student. This will return the URL for that registered student to click in a browser to join the session.
Retrieving session attendance data
The LMS should call lstTrainingAttendeeHistory (using a WebEx Site Administrator account) to retrieve the detailed attendance data for a previous session. Note that it take on average one hour after a session ends for the data to be available. If registration functionality is used, the student’s title, company, phone number, address, etc will be recorded.

Test Result Retrieval
WebEx Training Center offers two types of testing: Training Manager client-based testing and Web-based testing.

Client-based Testing
During a live Training Center session, tests can be administered from within the “Testing and Polling” panel of the Training Center Manager client. These client-based test results can be saved to the host's local file system as a *.csv file. For an LMS system to access these results, the host would have to manually upload the test results *.csv file to the LMS server. The LMS system would have to parse the *.csv file in the proprietary WebEx test file format.

Web-based Testing
After a Training Center session has been scheduled, web-based tests can be added to the session from the WebEx Training Center My WebEx web page. Web-based tests can be set up to be taken by the students before, during, or after the live Training Center session. Currently, tests have to be administered from the WebEx Training Center web pages.

The LMS can retrieve web-based test information and student results using the following functions:

getTrainingSession and lstScheduledTests return basic information about each test associated with a session, including the test delivery status (STARTED, ENDED), due date, and a unique testID.

getTestInformation returns detailed information for a scheduled test associated with a training session. Information returned includes the names of the students who took the test and their grades. The LMS can then call getIMSTestResults for each student to retrieve their detailed test responses.

getIMStestDetails - returns detailed question information for a single test in a format compatible with the IMS Question and Test (QTI) ASI Specification 1.2. The returned information describes each question, all possible answers, and scoring guidelines. For the IMS QTI ASI specification and samples, refer to:

http://www.imsglobal.org/question/qtiv1p2/imsqti_asi_bindv1p2.html (spec)
http://www.imsglobal.org/question/qtiv1p2/imsqti_asi_bestv1p2.html (samples)

getIMStestResults - returns one student’s detailed test results in a format compatible with the IMS Question and Test Interoperability (QTI) Results Reporting Specification 1.2. The returned information describes a student’s test responses and resulting score for each question of an exam. For the IMS QTI specification and samples, refer to:

http://www.imsglobal.org/question/qtiv1p2/imsqti_res_bindv1p2.html (spec)
http://www.imsglobal.org/question/qtiv1p2/imsqti_res_bestv1p2.html (samples)
Recorded Sessions

WebEx Training Center currently offers client-based session recording. During a live session, the Instructor or a Training Coordinator attending the session can record the session to a local file. After the session ends, the Training Coordinator can upload the WebEx session recording file to the LMS server or content management system. The LMS can then post this recorded file to a web server to allow students who missed the live session or want to review to access it.

In 2005, WebEx Training Center will offer network-based session recording. With network based recording, the live session can be automatically saved onto the WebEx remote servers. WebEx will publish XML API functions to allow an LMS to query and return the URLs to playback these network based recordings.

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